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Drought Impacts on Agricultural Production and Land Fallowing in California's Central Valley in 2015

**Abstract:**

The ongoing drought in California substantially reduced surface water supplies for millions of acres of irrigated farmland in California's Central Valley. Rapid assessment of drought impacts on agricultural production can aid water managers in assessing mitigation options, and guide decision making with respect to mitigation of drought impacts. Satellite remote sensing offers an efficient way to provide quantitative assessments of drought impacts on agricultural production and increases in fallow acreage associated with reductions in water supply. A key advantage of satellite-based assessments is that they can provide a measure of land fallowing that is consistent across both space and time. We describe an approach for monthly and seasonal mapping of uncultivated agricultural acreage developed as part of a joint effort by USGS, USDA, NASA, and the California Department of Water Resources to provide timely assessments of land fallowing during drought events. This effort has used the Central Valley of California as a pilot region for development and testing of an operational approach.

To provide quantitative measures of uncultivated agricultural acreage from satellite data early in the season, we developed a decision tree algorithm and applied it to timeseries of data from Landsat TM, ETM+, OLI, and MODIS. Our effort has been focused on development of indicators of drought impacts in the March - August timeframe based on

measures of crop development patterns relative to a reference period with average or above average rainfall. To assess the accuracy of the algorithms, monthly ground validation surveys were conducted across 650 fields from March - September in 2014 and 2015. We present the algorithm along with updated results from the accuracy assessment, and data and maps of land fallowing in the Central Valley in 2015.